

of the fruit showing the projections into its cavity, to the posterior of which the seeds are attached.

- Fig. 16. The dorsal aspect of the ovary of *Brunia lanuginosa*, the limb of the calyx having been removed; 17. the sutural aspect; and 18. the same as seen laterally, showing also the placentation.
- Fig. 19. A perpendicular section of the ovary of *Morus nigra*; and 20. a transverse section of the same:—*a*, the thickened side to which the ovule is attached.
- Fig. 21. A perpendicular section of a young fruit of *Elatostemma montana*; and 22. a transverse section of the same:—*a*, the thickened side to which the seed is attached.
- Fig. 23. An ovary of *Parietaria officinalis*.
- Fig. 24. A transverse section of the ovary of *Cannabis*:—*a*, the axillary or posterior side.
- Fig. 25. A caryopsis of *Casuarina equisetifolia* in longitudinal section:—*a*, its anterior angle. The seed (which fills the cavity) having been removed, its attachment with another which is immature is seen at the upper part; the perfect seed having become pendulous and half anatropal during its growth to maturity.

XLIV.—On some points relating to the Structure and Mechanism of the Wolf-fish (*Anarrhichas Lupus*). By EDWARDS CRISP, M.D.\*

I AM desirous of bringing before the Members of the Society some facts relating to the organization of this singular animal, which, as far as I know, have not yet been especially noticed by comparative anatomists.

The character and habits of the fish are so well known that it would be loss of time to dwell upon them; indeed the external form of the head, large mouth, and the peculiarity of the dental apparatus, are at once indicative of the nature of its food and of the ferocity of its disposition.

Although not unfrequently taken on the British coast, it is supposed that the *Anarrhichas* seldom attains its normal size on our shores. In the North of Europe they are sometimes found 6 or 7 feet in length, but here they rarely exceed 3 or 4 feet. Of five specimens that I have examined (all taken near the British coast) the length (from the nose to the root of tail-fin) was as follows:—

1st. 3 feet 2 inches.    2nd. 3 feet 1 inch.    3rd. 3 feet.  
4th. 2 feet 9 inches.    5th. 2 feet 7 inches.

The dental apparatus of this fish, I believe, differs from that of all others that we are acquainted with. Hunter alluded to it in 1774, and Mr. André in the 'Philosophical Transactions'

\* Communicated by the Author, having been read before the Zoological Society of London, March 8th, 1853.

(vol. 74) gives a drawing of the jaws and teeth, as well as a short description of the mechanism of these parts. Professor Owen, however, in his 'Odontographia,' 1845, is more minute in his account of the structure of the teeth, including their external forms, &c. Mr. Yarrell and others have likewise described it; but I do not know of any accurate description of the general form of the viscera, and it appears to me, that the contemplation of the visceral, in conjunction with the dental organization of this animal will add much to the interest of the subject.

The specimen which I have recently dissected, and parts of which I now exhibit, especially attracted my notice in consequence of the escape, *per anum*, of a large piece of rough whelk-shell about an inch and a quarter in length, and in some parts  $\frac{3}{4}$  of an inch wide. And in passing a stream of water through the alimentary canal, I collected from the excreta these portions of whelk-shell and hermit-crab, which could be felt externally in the intestines. They are large, sharp, irregular in shape, and apparently not acted upon in the slightest degree by the gastric juice. This circumstance struck me as being very remarkable, as in the great majority of fish that I had examined, I found no bones in the intestines, so powerful and rapid are the digestive powers of the stomach in this class of animals.

Let us now then take a glance at some parts of the structure of the *Anarrichas*, and first of the mouth and alimentary canal. The mouth is furnished with strong jaws, a large number of teeth of a peculiar form (as exhibited by the specimens), a thick angular tongue well fitted for directing the crustacea and mollusca (upon which the animal chiefly feeds) between the teeth, and with very powerful muscles to assist in the process of shell-crushing. If the mechanism of this mill is carefully examined, it will be seen that the large and pointed grappling irons formed by the front teeth are for the purpose of securing the prey, whilst the crushing process is performed by the conical molars in the jaws and palate, assisted by the powerful action of the tongue, which when elevated serves to keep the shell between the palatine teeth and those of the lower jaw. It is essentially an apparatus for crushing and breaking, not for grinding and pulverizing; the form of the alimentary canal, as will be seen hereafter, not requiring this mode of preparation of the food.

The teeth in these fish vary much both in shape and number; thus in four skeletons now before me, the largest measuring 3 ft. 2 inches, the shortest 2 ft. 7 inches No. 1. has 75 teeth, 41 blunt and 34 pointed. No. 2. 85 teeth, 43 blunt and 42 pointed. No. 3. 80 teeth, 60 blunt and 20 pointed. No. 4. 70 teeth, 39 blunt and 31 pointed. There is another remarkable circumstance respecting the teeth of this animal. In two of the four

specimens the long process of the premaxillary bone contains teeth, but in the remaining two they are absent; nor does the absence appear to depend upon age, judging from the specimens alluded to.

In only one specimen of six that I have seen are the front teeth perfect, a circumstance readily accounted for from the nature of the food and the ferocity of the fish, which, when captured, bites at everything presented to it. The one on the table snapped a large stick with the greatest ease, and Mr. Quekett tells me that he has met with several of the spines of the larger *Echini* broken by the teeth of this animal. Another reason may be mentioned likewise why the teeth are so often broken. The alveolar process is very slight, and the crown of the tooth is but imperfectly attached to the bone beneath, so that it would not require much force to fracture it.

The œsophagus is very short, and large in diameter. The stomach, which has no cæcal appendages, is about 5 inches in length, thick, and muscular, and furnished with rugæ, which, towards the pylorus, present a honeycomb-like appearance. The pyloric opening is supplied with a strong valvular ring, which is very dilatable, and would readily admit the passage of large pieces of shell into the duodenum. The intestines, from the mouth to the anus, measure 46 inches, and are of large size throughout, measuring (when distended) from 1 inch to an inch and a quarter in diameter. On comparing these with the intestines of the Carp weighing 6 lbs., the contrast is most remarkable, for although the alimentary canal of the latter fish is 40 inches long, the calibre of the tube is at least four-fifths less than that of the *Anarrhichas*. The anal opening is very large.

The liver is of a whitish colour and fatty. The gall-bladder very large, holding 11 drachms of water by measurement. The spleen (milt) of an oval form, and resembles somewhat the spleen of a large gallinaceous bird. The kidneys are 10 inches in length, the urinary bladder rather small, and the air-bladder is wanting. The subjoined is the weight of the various organs.

Weight of fish  $12\frac{1}{2}$  lbs. ; length 2 ft. 9 inches.

Weight of liver 1880 grains ; spleen 110 grs. ; kidney 506 grs. ; heart 120 grs.

The blood globules of this fish do not differ from those of many other species that I have examined.

In a future communication my endeavour will be to show, by the aid of the microscope, the structure of the lining membrane of the alimentary canal, which probably possesses some peculiarities which enable it to resist the hard, rough and angular pieces of shell that are constantly in contact with it. My object in this paper has been more particularly to point out the large

diameter of the alimentary tube, its important connexion with the nature of the food and the dental apparatus, and the enormous size of the gall-bladder; points, as far as I know, that have not been before specially alluded to.

21 Parliament Street, April 23, 1853.

## PROCEEDINGS OF LEARNED SOCIETIES.

### ZOOLOGICAL SOCIETY.

March 25, 1851.—William Yarrell, Esq., Vice-President, in the Chair.

#### 1. ON A NEW SPECIES OF THE GENUS MONTIFRINGILLA.

By JOHN GOULD, F.R.S.

For a knowledge of this species we are indebted to Lord Gifford, by whom several examples were killed in Thibet. It is intimately allied to *Montifringilla Gebleri*, but differs in being of a larger size, in the darker colouring of the head and face, and in the deeper tint of the back and rump; the latter part is moreover ornamented with a patch of blood-red, which has suggested the specific name of *hæmatopygia* as an appropriate appellation; it also differs from *M. Gebleri* in being destitute of the orange-red mark on the shoulders.

#### MONTIFRINGILLA HÆMATOPYGIA.

Face and forehead brownish black, gradually blending into the light greyish brown of the upper surface; rump stained with blood-red; upper tail-coverts brown, tipped with dull white; tail dark brown, each feather margined externally with white; wing-coverts hoary; wings dark brown, the first four primaries narrowly edged with white, the next five primaries with a broad streak of white along the basal portion of their external webs, terminating in a line with the extremities of the secondaries, which are externally fringed with hoary; spurious wing dark brown, margined at the base with whitish; under surface very light brown, gradually becoming paler, until on the under tail-coverts the hue is buffy white; bill and feet bluish black.

Total length,  $6\frac{1}{2}$  inches; bill,  $\frac{1}{2}$ ; wing,  $4\frac{1}{4}$ ; tail,  $2\frac{1}{2}$ ; tarsi, 1.

#### 2. ON SOME NEW SPECIES OF TROCHILIDÆ.

By JOHN GOULD, F.R.S.

Mr. Gould exhibited some remarkably fine examples of the *Trochilus Jardini* of Bourcier, and then characterized the following species:—

#### TROCHILUS (— ?) AMABILIS.

Crown of the head shining metallic green; chin black; breast beautiful shining blue, with a line of lustrous green commencing at the angle of the bill, passing down the sides of the neck and sur-